

# **Stabilization of Infinite Dimensional Systems: ASCC 2017**

**Sunday, December 17, 2017 - Sunday, December 17, 2017**

**Gold Coast Convention and Exhibition Centre**

## **Scientific Program**

This workshop aims to be an introduction to stabilization theory for infinite dimensional dynamical systems, with emphasis on the linear time invariant case. This is a field of growing interest for new applications, namely to mechanical or aerospace engineering, medicine or ecology. New mathematical and computational tools developed within the last decade make now possible the development of efficient methods for the control and identification of highly complex systems, generally described by evolution partial differential equations.

## **Stability and stabilizability concepts for linear infinite dimensional dynamical systems**

This lecture begins by describing in an introductory manner various concepts of stability of infinite dimensional systems with emphasis that, unlike in classical infinite dimensional linear systems, a variety of non equivalent stability types can be encountered in relatively simple PDEs systems. The

second part of this presentation is devoted to some by now classical tools to establish stability properties, namely in the frequency domain. Finally, a particular attention will be devoted to examples described by hyperbolic PDEs, where stabilization is achieved using collocated actuators and sensors.

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## **Backstepping methods**

The use of linear Volterra operators in constructing backstepping transformations and feedback laws for stabilization of PDE systems by boundary control will be reviewed. Basic PDEs of both parabolic and hyperbolic types will be covered. With time permitting, an example of backstepping in observer design with boundary sensing will be covered.

## **From finite to infinite dimensional systems: approximation and interconnection issues**

In practical problems the control laws of infinite dimensional systems are computed using projections on finite dimensional systems. Moreover, some applications are naturally described by couplings of infinite dimensional systems with finite dimensional ones. This presentation to describe the interconnections of these systems and the properties of the control laws computed on projected systems when inserted in the original infinite dimensional ones.